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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/748,965	12/27/2000	Marc W. Cantell	BU-99-022B	7066

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EXAMINER

MOORE, KARLA A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/748,965

Applicant(s)

CANTELL ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10,13-21 and 23-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10, 13-21, 23-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10, 13-21, 23-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,478,780 to Koerner et al. in view of U.S. Patent No. 5,043,299 to Chang et al. in view of U.S. Patent No. 4,966,519 to Davis et al. in view of U.S. Patent No. 4,911,597 to Maydan et al.

3. Koerner et al. disclose an apparatus for forming a silicide on a surface of a silicon (column 4, row 59) semiconductor substrate, comprising: a plurality of interior chambers (Figure 1, 1-6; abstract) in which multiple method stages (including removing an oxide using a cleaning agent, depositing a metal layer, etching and heating) can be carried out at high vacuum without interruption (column 5, rows 1-10). The apparatus is adapted to heat a substrate to form a silicide on a surface of the substrate (column 3, rows 35-39). The at least one interior chamber is adapted to remove said oxide from said surface of the substrate while under continuous vacuum (column 3, rows 6-7) and at least one interior chamber adapted to deposit a metal on said surface of the substrate while under a continuous vacuum (column 3, rows 35-36).

4. With respect to claim 13, at least one interior chamber is adapted to heat said substrate (column 5, rows 9-10).

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5. With respect to claims 14 and 23, the apparatus is adapted to transfer said substrate between chambers without breaking vacuum conditions (column 5, rows 27-30).
6. With respect to claims 17 and 24, the deposition metal may be cobalt (column 3, rows 35-36).
7. With respect to claim 18, the interior chamber adapted to deposit said metal on said surface of said substrate is a vapor-sputtering device (column 3, rows 35-36).
8. With respect to claim 19, the apparatus is further adapted to transfer said substrate to said heating chamber from said metal deposition chamber (column 5, rows 27-30).
9. With respect to claim 20, the deposited silicide is cobalt silicide (column 3, rows 35-40).
10. However, while Koerner et al. do disclose that the interior chambers are equipped with the apparatus known to be needed for the respective processes (column 5, rows 11-15) they fail to disclose the specific structural details of the apparatus needed.
11. Chang et al. disclose an apparatus for forming a film on a semiconductor substrate comprising: at least one workpiece holder (Figure 1, 16); a least one input line adapted to provide a chemical agent into said chamber (22); at least one output line adapted to remove said cleaning agent (26); a heating element (15,45) in said chamber adapted to heat said substrate to an elevated temperature; and a reactor adapted to deposit a metal (50). The apparatus and process of Chang et al. are provided for the purpose of processing a wafer without exposing the cleaned wafer to conditions that would re-contaminate the cleaned wafer prior to deposition. It is noted that Chang et al. teach the use of nitrogen fluoride to as a cleaning gas for the purpose of removing silicon oxides from silicon surfaces (column 3, rows 16-20).

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12. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have equipped the chambers with the apparatus known to be needed for the respective processes in Koerner et al. in order process a wafer without exposing a cleaned wafer to contamination prior to deposition.

13. Examiner notes that although the prior art disclosed above does disclose the materials as claimed all that is required is that the cited apparatus be capable of a process using such materials. The courts have ruled that expressions relating the apparatus to the contents thereof during an intended operation are of no significance in determining the patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

14. Koerner et al. and Chang et al. disclose the invention substantially as claimed and as described above, including isolating the chambers from an outside environment.

15. However, Koerner et al. and Chang et al. fail to teach placing the interior processing chambers located inside a vacuum buffer chamber.

16. Davis et al. teach providing a way for wafers to be transferred from one processing station to another without ever exposing them to pressures higher than 10^{-5} torr for the purpose of preventing them from exposure to airborne particulates, vastly reducing the possibilities for particulate collection on wafers (column 3, rows 28-41). This teaching is facilitated by having a process module (Figure 5, 102) which contains processing stations (104).

17. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided processing chambers inside of a process module in

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Koerner et al. and Chang et al. in order prevent them from exposure to airborne particulates, vastly reducing the possibilities for particulate collection on wafers as taught by Davis et al.

18. Koerner et al., Chang et al. and Davis et al. the invention substantially as claimed and as described above.

19. However, Koerner et al., Chang et al. and Davis et al. fail to teach at least one line operatively connected to a chamber (buffer chamber surrounding the processing chambers) between said at least one pump and said chamber.

20. Maydan et al. teach providing a vacuum chamber with an exhaust line in order to evacuate the chamber to a sub-atmospheric pressure (column 7, rows 57-60).

21. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an exhaust line in Koerner et al., Chang et al. and Davis et al. in order to evacuate the buffer chamber to sub-atmospheric pressure as taught by Maydan et al.

22. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koerner et al., Chang et al., Davis et al., and Maydan et al. as applied to claims 10, 13-21, 23-27 and 29 above, and further in view of Japanese Patent Publication No. 63-000480 A to Takebayashi et al.

23. Koerner et al., Chang et al., Davis et al., and Maydan et al. disclose the invention substantially as claimed.

24. However, Koerner et al., Chang et al., Davis et al., and Maydan et al. fail to teach a heating element external to the chamber.

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25. Takebayashi et al. teach the use of a heater located outside a vacuum deposition chamber for the purpose of diminishing the time it takes to raise or lower temperatures of objects within the chamber (abstract and use).

26. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a heating element external to the chamber in Koerner et al., Chang et al., Davis et al., and Maydan et al. in order to diminish the time it takes to raise or lower temperatures within the vacuum chamber as taught by Takebayashi et al.

Response to Arguments

27. Applicant's arguments, see Paper No. 11, filed 7/4/03, with respect to the rejection(s) of claim(s) 10, 13-21, 23-27 and 29 as obvious over Koerner et al. in view of Cheng et al. and in view of Kakehi et al. and in view of Maydan et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made using Davis et al. to correct the deficiencies.

28. With respect to claims 10 and 13-20, Applicant argues that the claimed invention differs from the prior art applied in that the claimed invention is for selectively forming a silicide. Examiner regards this as an intended use of the apparatus, which does not structurally distinguish the claimed invention from the prior art. Nor does the inclusion of the item worked upon (the semiconductor substrate) by the apparatus distinguish the claimed invention from the prior art.

29. The courts have ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed

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apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

30. The courts have also ruled that inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. In re Young, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935) (as restated in In re Otto, 312 F. 2d 937, 136 USPQ 458, 459 (CCPA 1963)).

Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McMillan also teaches enclosing a plurality of processing chambers in a mainframe chamber.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

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September 9, 2003

Primary Examiner

AU 1763

P. Hassanzadeh